

Liebert® CRV from 11 to 50 kW

Efficient Cooling for IT Equipment





Liebert® CRV Row-Based Cooling

■ **Emerson Network Power** delivers innovative solutions through 12 Centers of Expertise, distinct areas of breakthrough products and services that help determine what is needed in relation to the application. Supported by a global network in more than 150 countries, backed by local service and support from more than 2,000 certified professionals, Emerson Network Power is uniquely positioned to provide systems and integrated solutions wherever our customers are located. Emerson Network Power understands the challenges of setting up the right infrastructure to support business-critical data center operations and helps respond to any demand by providing innovative solutions, allowing customers to concentrate on their business requirements.



Liebert® CRV 300 mm DX

■ **The Liebert CRV**, row-based cooling unit is optimized to ensure maximum cooling capacity in a minimal footprint. Targeted for small and medium data centers, the unit provides cooling at the server rack level.

The Liebert CRV has been designed to deliver the highest efficiency and availability, by removing heated air from the data center hot aisles, using it to return cooled air to the servers (cold aisle). The Liebert CRV is available in Direct Expansion, as well as Chilled Water versions and in two frame widths - 600 mm and a compact 300 mm. Providing full capacity and airflow modulation to match the servers' load, the unit is able to deliver energy savings via Scroll Compressor with capacity modulation, Electronic Expansion Valve and variable speed EC Fans. The Liebert CRV

is a comprehensive row-based solution that includes all of the main functions fundamental to cooling units, such as cooling, humidification, dehumidification, re-heating, air filtration, condensation management, temperature and humidity control, alarm functions and data communications.

Furthermore, the unit enhances its performances and energy efficiency through the Liebert iCOM™ Control, capable of optimizing unit operations by leveraging on its intelligent management of system components. All components are easily accessible from the front and the rear of the unit, granting simplified service intervention.

The unit also allows ease of installation, through simplified cable and pipes routing from top and bottom of the unit.



*Data Center cooling infrastructure
for small and large applications.*



Designed to Optimize IT Performance

Features and Performances

- Units ranging from 11 - 50 kW with chilled water and direct expansion versions
- Industry's highest energy saving levels achieved - increase of up to 50% when the Liebert® CRV is combined with SmartAisle™ cold aisle containment
- Best-in-class Thermal Management unit for row-based applications
- On-site adjustment capability of air diffuser distribution direction maximizes cooling results
- Integrated iCOM™ Control for management of capacity and airflow through EC Fans and variable capacity Scroll Compressor
- Ideal for scalable IT infrastructure - increased cooling capacity, reduced noise levels and enhanced efficiency when compared with similar chilled water and direct expansion configurations.

The Liebert® CRV, self-contained Thermal Management unit is ideal for the cooling of data center rack rows.

The Liebert CRV is a multi-option, precision air conditioner that delivers temperature and humidity control, as well as filtration and notification management, ensuring that data center temperatures are maintained at an optimum level.

The unit is designed to continuously monitor variations in heat loads and instantly deliver the most efficient and effective cooling necessary.

Liebert CRV: Simple, Safe, Adaptable.

The Liebert CRV is a plug-and-play unit with the capability of addressing the needs of both open and contained applications.

Cooling is provided at the server rack level rather than the room level. The Liebert CRV removes and filters hot air from the data center aisles, using it to return

cooled air to the servers.

The integrated air diffusers accurately direct the airflow towards the necessary direction of the heat load.

Furthermore, Liebert CRV is designed to comply with mission-critical requirements and ensure that servers are maintained at the correct temperature and humidity levels.

The Liebert CRV provides the exact level of cooling required by servers, modulating the airflow and cooling capacity.

The unit is available in two versions to meet various installation demands:

- A stand-alone, direct expansion system with variable capacity up to 36 kW, available in both 300 mm and 600 mm versions, complete with roof or wall-mounted condenser.
- A chilled water system with up to 50 kW of capacity available in both 300 mm and 600 mm versions.

Ensuring Availability Under All Working Conditions

Maintaining IT Infrastructure Availability

With integrated iCOM™ Control, the Liebert CRV is able to monitor variations in temperature and humidity, instantly adapting its performance to meet variations in load conditions.

This furthermore ensures increased availability and safety of protected IT equipment.

The Liebert CRV's constant temperature monitoring and control capabilities ensure the availability of servers in all working conditions.

Furthermore, its parallel load sharing functionality enables the management of N+1 configurations.

Meeting Primary IT Requirements

The Liebert CRV's ability to modulate capacity allows for constant, accurate room temperature and humidity levels to be maintained.

The variable capacity capability of the Liebert CRV, contributes to increasing data center availability during both standard operations

and in the event of load variations.

A reduction in its start/stop cycling function further contributes to increasing data center availability, as well as lengthening the life of critical components.

The integrated compressors with cooling capacity modulation are designed to avoid peaks in absorbed power, thus reducing the stress placed on components. The Liebert CRV uses a dedicated control that also enables the compressor to operate when the external air temperature increases above standard limits.



The Liebert® CRV 600 mm, self-contained Thermal Management unit is ideal for the cooling of row-based applications.



Extreme Flexibility for Open and Closed Architectures

Suitable For a Wide Range of Installations

The Liebert® CRV addresses the cooling needs of both new and existing data center space, regardless of raised floor availability. It is ideally suited to data centers with up to 50 racks, irrespective of heat load.

Configuration Flexibility

The Liebert CRV can be configured to perform temperature as well as humidity control. The Liebert CRV 300 mm and 600 mm width versions have been designed to specifically meet the requirements of data centers in need of optimizing space occupancy, as well as capital and running costs.

The Ideal Airflow

EC Fans and compressors with variable cooling capacity, managed through integrated iCOM™ Control, achieve flexible capacity and airflow for the ideal operating conditions of IT equipment.

The Liebert CRV, designed using advanced, computer-aided dynamic fluid technology, delivers optimum air distribution across rack installations. The exceptional levels of air distribution have been proven as a result of wide-scale laboratory and field testing.

Optimizing Total Cost of Ownership

Delivering Optimized Results

Ideally suited for rack-level cooling and specifically designed for high return air temperatures, the Liebert CRV optimizes air distribution and maximizes efficiency, delivering both cost and energy-related savings.

Efficiency is further enhanced through the use of the environmentally friendly R410A refrigerant which ensures constant operation at the highest efficiency levels.

The Liebert CRV is also designed to optimize installation and minimize start up, connection and labor investments. Total cost of ownership advantages are also achieved as a result of the Liebert CRV configuration flexibility. The unit is available for integration with existing racks or as a bundled solution combined with racks, UPS and monitoring capabilities.

Energy Efficient Cooling

The integrated iCOM Control, equipped with up to 20 rack temperature sensors, continuously monitors the heat load of the racks and regulates the Liebert CRV, ensuring it provides the most effective level of cooling while at the same time delivering energy savings. Variable capacity compressors modulate the cooling capacity, thus reducing input power with partial loads. EC Fan technology regulates airflow and reduces fan input power.



The integrated iCOM™Control monitors variations in temperature and humidity, instantly adapting Liebert® CRV performance to meet changes in load conditions.



LIFE™ Remote Diagnostic and Preventive Monitoring Service

Emerson Network Power's service program is designed to ensure that your critical Thermal Management system is maintained in an optimum state of readiness at all times.

The **LIFE** remote diagnostic and preventive monitoring service provides early warning of Thermal Management conditions and out of tolerances. This allows effective proactive maintenance, fast incident response and remote trouble shooting, giving customers complete security and peace of mind.

With **LIFE** services you will benefit from:

Uptime Assurance

Constant monitoring of the units' parameters, thus maximizing the system's availability.

First Time Fix Rate

Pro-active monitoring and data measuring ensure that when our customer engineers are dispatched on-site, they arrive prepared for first time resolution.

Proactive Analysis

From LIFE service centers, our experts proactively analyze the data and trends of your equipment, to recommend actions to ensure their best performance.

Minimized Total Cost of Ownership of Your Equipment

The continuous monitoring of all relevant parameters in turn maximizes unit performance, reduces on-site maintenance and extends the life of your equipment.

Fast Incident Response

LIFE allows for immediate definition of the best course of action, as a result of the regular communication between your **Liebert® CRV** unit and our **LIFE** service centers.

Reporting

You will receive a comprehensive report detailing the working order of your equipment and its operational performance.



#LIFERemoteService 



Customer Monitoring Interfaces

■ Basic Web Access

Basic operational information can be made available through the monitoring feature offered by the iCOM™ Control over Ethernet. A web browser is the only requirement needed for the unit to communicate directly with the local or remote web interface.

■ Monitoring and Control Through Existing Network Via your Web Browser

The Liebert® CRV system can be fitted with a Liebert IntelliSlot Unity Card allowing full advantage to be taken of the Ethernet network and remote monitoring from your computer desktop, network operations center or any network access simply utilizing a standard web browser. A standard web browser, via HTTP protocol or Network Management System software via SNMP protocol, can be used to access the unit information.

■ Monitoring Integration with Existing Building Management System

If required, by installing the optional Unity card, the Liebert CRV can be monitored and controlled by an existing Building Management System. The Unity

card provides Modbus, Bacnet and SNMP protocol support, other than the Web monitoring capability.

■ Liebert Nform™ Software Centralized Management

As business grows, critical equipment infrastructure expands, thus the need for centralized management of any equipment is key to business success. Connecting to equipment in the distributed critical space is only part of the monitoring challenge. Liebert Nform leverages the network connectivity capabilities of Liebert CRV to provide centralized monitoring of the distributed equipment. Utilizing the SNMP and Web technologies integrated in the Liebert IntelliSlot communication card, Liebert Nform centrally manages alarm notifications and provides an intuitive interface to access critical status information. Liebert Nform allows critical system information to be readily available to support personnel wherever they are, increasing responsiveness to alarm-event conditions, thus allowing IT organizations to maximize their system availability.

Liebert SiteScan® Web Control, Data Capture, Energy Management and Planning

For customers who require extensive management of critical system equipment spanning multiple locations in an ever-moving global enterprise, Liebert SiteScan Web will centrally manage critical equipment and give the power to move beyond the event responsive service paradigm.

Liebert SiteScan Web does it all

- Real-Time Monitoring and Control
- Event Management and Reporting
- Data Analysis and Trending
- Building Management Integration

Liebert SiteScan Web is a comprehensive critical system management solution dedicated to ensuring reliability through graphics, event management and data export. The standard web interface allows users easy access from anywhere, anytime.



Data Center Application Scenarios

Data Center Rooms with up to 10 Racks

The Liebert® CRV is installed in close proximity to servers for installations relating to network access cabinets and small computer rooms, regardless of the presence of a raised floor.

The cooling unit, equipped with ten temperature sensors, modulates the airflow to match the real-time cooling requirements of the server.

Direct Expansion Solution

When a chilled water system and physical building limitations restrict the installation of chillers, a direct expansion solution is the ideal choice.

In the event that internal and external units are installed in close proximity, direct expansion units are able to deliver significant reductions in installation-related time and costs. One of the advantages of the Liebert CRV with

a direct expansion solution is the eco-friendly refrigerant R410A. The unit also offers variable capacity scroll compressor, which has the capability of immediately modulating and adapting its operation according to server cooling requirements. It significantly minimizes start/stop cycling, extending the life cycle of your cooling equipment. The Liebert CRV, operates with a significant return air temperature, which contributes to maximizing cooling capacity and increasing efficiency without placing additional stress on compressors.

| | | |
|-------------------|----------------------|---------------------|
| Scenario 1 | N° of Racks | 1 to 4 |
| | Heat Load | Up to 20 kW |
| | Space | From 5 m² and 15 m² |
| | Raise Floor | - |
| | Recommended Solution | Direct Expansion |



| | | |
|-------------------|----------------------|------------------|
| Scenario 2 | N° of Racks | Up to 10 |
| | Heat Load | Up to 100 kW |
| | Space | Up to 30 m² |
| | Raise Floor | - |
| | Recommended Solution | Direct Expansion |





Data Center Rooms with up to 50 Racks

The Liebert® CRV's integration with SmartAisle™ proves to be the ideal cold aisle containment approach for small data centers requiring heat density increases. This solution has the added advantage of avoiding the installation of raised floors or heightening roof levels.

Chilled Water Solution with SmartAisle

The SmartAisle separates hot returning air and cold supply air, optimizing the entire cooling solution. By increasing the room temperature, the floor-mounted cooling units can be significantly downsized, reducing the overall level of investment. The higher Energy Efficiency Ratio also improves energy savings and dramatically reduces running costs. The solution delivers the best results when combined with the Liebert HPC - maximizing the freecooling effect and reducing running costs.

| | | |
|-----------------------------|----------------------|---------------|
| Scenario 3 | N° of Racks | 10 to 20 |
| | Heat Load | Up to 200 kW |
| | Space | Up to 50 m² |
| | Raise Floor | - |
| | Recommended Solution | Chilled Water |



Combining the Liebert CRV with the Liebert HPC Freecooling Chiller for Increased Advantages

Chilled water solutions are optimized to reduce energy consumption:

- With the use of EC Fans and the unit's close proximity to the racks, the Liebert CRV minimizes fan power input and can be regulated based on server load levels.
- As it is specifically designed for high return air temperatures, the Liebert CRV can operate at high chilled water temperatures while maintaining capacity, thus maximizing the chiller freecooling effect.

| | | |
|-----------------------------|----------------------|---------------|
| Scenario 4 | N° of Racks | Up to 50 |
| | Heat Load | Up to 300 kW |
| | Space | Up to 100 m² |
| | Raise Floor | - |
| | Recommended Solution | Chilled Water |



Liebert® CRV Technical Data

| | | CR011RA | CR021RA | CR020RA/W | CR035RA/W | CR038RC | CR060RC | CR040 | CR050 |
|------------------------------------|-------------------|---------------|---------|---------------|-----------|-------------------|---------|---------------|-------|
| Net Sensible Cooling Capacity [kW] | | 11.7 | 20.7 | 24.2 | 37.7 | 38.4 | 57.0 | 46.6 | 57.9 |
| Nominal Airflow | m ³ /h | 2700 | 4050 | 4170 | 5540 | 5420 | 7758 | 5650 | 7410 |
| Weight | [kg] | 220 | 230 | 335 / 350 | 365 / 385 | 220 | 230 | 330 | 365 |
| Humidity Control | | Yes | Yes | Yes | Yes | Yes | Yes | Yes | No |
| Dimensions H x W x D | [mm] | 2000x300x1100 | | 2000x600x1175 | | 2000x300x1100 (*) | | 2000x600x1175 | |

Note: The performances shown above refer to an air inlet temperature of 38°C, condensing temperature for air and water-glycol cooled units of 45°C and a chilled water temperature of 7/12°C. (*) Unit available also with a 2200 mm height and 1200 mm depth.



Liebert® CRV 300 mm CW

Standard Features and Options

DX Version

- High efficiency scroll compressor with capacity modulation
- Electronic expansion valve
- EC plug fans
- R410A Refrigerant
- Adjustable modular baffle system
- Top and bottom connections
- Casters and levelling feet
- Filters with up to F5 filtration class and clog filter switch
- Electrode humidifier
- Electric reheat 1-stage
- Internal condensate pump
- iCOM™ Control large graphic display
- (6) remote rack temperature sensors
- Monitoring card for WEB, Modbus and BACnet
- 5 port ethernet switch

CW Version

- EC plug fans
- 3-way or 2-way valve with 0-10 V actuator
- Adjustable modular baffle system
- Top and bottom connections
- Casters and levelling feet
- Filters with up to F5 filtration class and clog filter switch
- Electrode humidifier
- Electric reheat 1-stage
- Internal condensate pump
- iCOM™ Control large graphic display
- (6) remote rack temperature sensors
- Monitoring card for WEB, Modbus and BACnet
- 5 port ethernet switch

Additional Options

DX Version

- Extra iCOM Control display
- Additional remote rack temperature sensors
- Compressor jacket (600 mm models)
- Dual power supply with ATS
- Sitescan® monitoring card

CW Version

- Extra iCOM Control display
- Additional remote rack temperature sensors
- Dual power supply with ATS
- Sitescan monitoring card
- Cooling capacity meter



Coupling Air Cooled Liebert® CRV Units with Air Cooled Condensers

| Model | Ambient Temperature up to 35° C | | Ambient Temperature up to 40° C | | Ambient Temperature up to 46° C | |
|----------------|---------------------------------|-----------|---------------------------------|-----------|---------------------------------|-----------|
| | Standard Noise | Low Noise | Standard Noise | Low Noise | Standard Noise | Low Noise |
| CR011RA | 1 x HCR17 | 1 x HCR33 | 1 x HCR33 | 1 x HCR43 | 1 x HCR43 | 1 x HCR51 |
| CR021RA | 1 x HCR33 | 1 x HCR43 | 1 x HCR43 | 1 x HCR51 | 1 x HCR51 | 1 x HCR59 |
| CR020RA | 1 x HCR33 | 1 x HCR43 | 1 x HCR43 | 1 x HCR51 | 1 x HCR51 | 1 x HCR59 |
| CR035RA | 1 x HCR51 | 1 x HCR59 | 1 x HCR51 | 1 x HCR59 | 1 x HCR76 | 1 x HCR88 |

Condensers Dimensions

| | | Width | Depth | Height | Weight |
|-------|-------------|-------|-------|--------|--------|
| HCR17 | [mm] / [kg] | 896 | 1053 | 980 | 49 |
| HCR33 | [mm] / [kg] | 1112 | 1340 | 910 | 75 |
| HCR43 | [mm] / [kg] | 1112 | 2340 | 910 | 92 |
| HCR51 | [mm] / [kg] | 1112 | 2340 | 910 | 93 |
| HCR59 | [mm] / [kg] | 1112 | 2340 | 910 | 102 |
| HCR76 | [mm] / [kg] | 1112 | 3340 | 910 | 136 |
| HCR88 | [mm] / [kg] | 1112 | 3340 | 910 | 165 |

Coupling Water/Glycol Cooled Liebert CRV Units with Drycoolers

| Model | Ambient Temperature up to 30° C | | Ambient Temperature up to 35° C | | Ambient Temperature up to 40° C | |
|---------------|---------------------------------|------------|---------------------------------|------------|---------------------------------|------------|
| | Standard Noise | Low Noise | Standard Noise | Low Noise | Standard Noise | Low Noise |
| CR20RW | 1 x ESM018 | 1 x ELM018 | 1 x EST028 | 1 x ELM027 | 1 x EST050 | 1 x ELT047 |
| CR35RW | 1 x EST028 | 1 x ELM027 | 1 x EST050 | 1 x ELT055 | 1 x EST070 | 1 x ELT065 |

Dry Cooler Dimensions

| | | Width | Depth | Height | Weight |
|--------|------|-------|-------|--------|--------|
| ESM018 | [mm] | 2236 | 820 | 1030 | 82 |
| EST028 | [mm] | 2866 | 1250 | 1070 | 133 |
| EST050 | [mm] | 2866 | 1250 | 1070 | 193 |
| EST070 | [mm] | 4066 | 1250 | 1070 | 283 |
| ELM018 | [mm] | 2236 | 820 | 1030 | 94 |
| ELM027 | [mm] | 3136 | 820 | 1030 | 139 |
| ELT047 | [mm] | 4066 | 1250 | 1070 | 225 |
| ELT055 | [mm] | 4066 | 1250 | 1070 | 254 |
| ELT065 | [mm] | 5266 | 1250 | 1070 | 302 |

Chilled Water Cooling

Chilled water cooling units may be coupled with Emerson Networ Power chillers (Liebert HPC or Liebert AFC series). The Liebert HPC chiller series offers a wide range of air cooled or water cooled solutions. Available with various noise thresholds and with freecooling modes, these units significantly enhance the system's energy saving capabilities. Liebert HPC freecooling chillers are available from 40 kW to 1600 kW. The Liebert AFC, Adiabatic Freecooling Chillers, are available from 500 kW to 1450 kW and are designed to maximize data center efficiency and availability.



Emerson Network Power

Thermal Management Data Center Infrastructure for Small and Large Applications



■ Liebert® HPC

Wide range of high efficiency Freecooling Chillers from 40 kW to 1600 kW

- Designed specifically for data center applications and to work with SmartAisle™
- Premium energy efficiency version
- iCOM™ Control featured



■ Liebert® PDX - Liebert® PCW

Liebert PDX available from 15-120 kW

Liebert PCW available from 30-220 kW

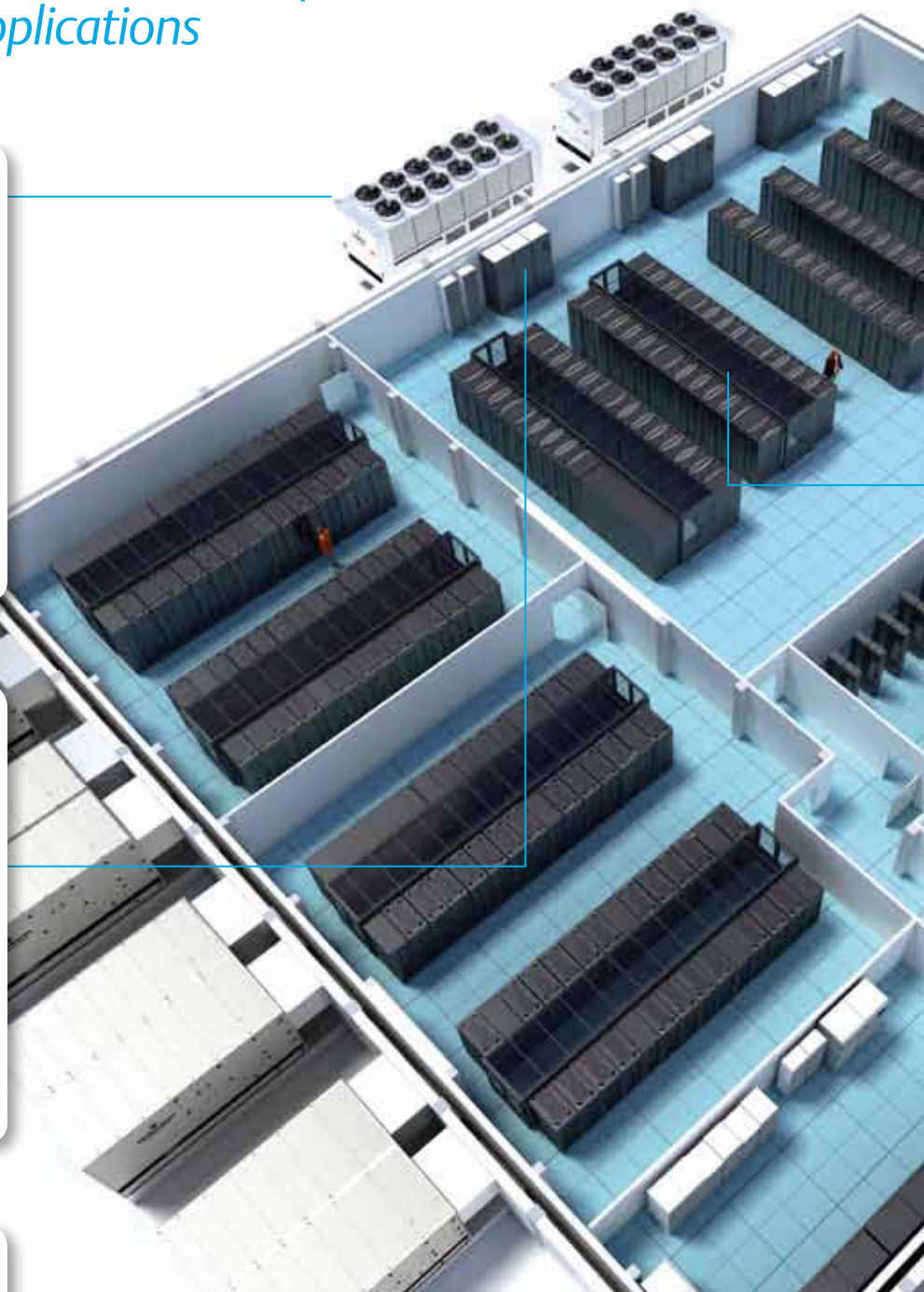
- Premium energy efficiency
- Eurovent certified performance
- Unique control capabilities with the iCOM Control



■ Liebert® EFC

Indirect evaporative freecooling unit

- iCOM Control featured
- New generation EC Fans
- Eurovent certified heat exchanger



Trellis™ Platform



Emerson Network Power's Trellis platform is a real-time infrastructure optimization platform that enables the unified management of data centre IT and facilities infrastructure. The Trellis platform software can manage capacity, track inventory, plan changes, visualize configurations, analyze and calculate energy usage, and optimize cooling and power equipment. The Trellis platform monitors the data center, providing a thorough understanding of system dependencies to help IT and facilities organizations keep the data center running at peak performance. This unified and complete solution, delivers the power to see the real situation in your data center, make the right decision and take action with confidence.



■ Liebert® AFC

The Adiabatic Freecooling Chiller available from 500-1450 kW

- Integrated adiabatic pad system
- High freecooling capacity
- 100% compressor back up

■ SmartAisle™

- Aisle containment
- Provides highest energy efficiency
- Works with any Liebert Thermal Management unit



■ Liebert® CRV

Row-based high efficiency cooling units available from 11-50 kW in DX and CW versions

- Full airflow and cooling capacity modulation to match server load and to save energy
- Best footprint capacity with the highest efficiency
- Six different control modes to ensure greater flexibility



■ Liebert® XD

Refrigerant based high density cooling installed close to the server

- Hot spot management for up to 30 kW per rack
- On-demand upgrade with plug and play
- High efficiency and 100% sensible cooling

Service

Emerson Network Power supports entire critical infrastructures with the largest global service organization and an extensive service offering, enhancing network availability and ensuring total peace of mind 24/7. Our approach to servicing critical infrastructure covers all aspects of availability and performance: from single power and thermal management equipment to entire mission-critical systems.

The most comprehensive insurance for business protection can be obtained with a service program from Emerson Network Power which includes access to LIFE™.



LIFE™

LIFE provides remote diagnostics and preventive monitoring service for UPS and thermal management equipment.

LIFE delivers increased uptime and operational efficiency by enabling continuous monitoring of your equipment, expert data analysis and field engineering expertise.

Through the data transferred from your equipment via LIFE, our remote service experts gain the real-time insight and information needed to quickly identify, diagnose, and resolve any irregularities that may arise in operation, ultimately taking responsibility for your critical assets 24/7.

Ensuring The High Availability Of Mission-Critical Data And Applications.

About Emerson Network Power

Emerson Network Power, a business of Emerson (NYSE:EMR), is the world's leading provider of critical infrastructure technologies and life cycle services for information and communications technology systems. With an expansive portfolio of intelligent, rapidly deployable hardware and software solutions for power, thermal and infrastructure management, Emerson Network Power enables efficient, highly available networks.

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MKA4L0UKCRV Rev. 4-06/2015

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